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FIELD SCREENING OF INSECTICIDES FOR CONTROL OF THE PINE SEEDWORM,

LASPEYRESIA ANARANJADA MILLER

Abstract. -- Three insecticides, Gardona[®], fenthion, and Azodrin[®], effectively controlled the pine seedworm, Laspeyresia anaranjada, on second-year slash pine cones in a field screening test.

Laspeyresia anaranjada Miller destroys seeds within maturing cones of slash pine, Pinus elliottii Engelm., in seed orchards in the Southern United States. This insect requires 1 year to complete its life cycle.¹ Moth emergence from cones of the previous year's crop, oviposition, and egg hatch occur during May in north Florida. One or two applications of an effective insecticide between May 5 and May 20 is sufficient for good control of L. anaranjada.

In earlier experiments^{2 3} in north Florida, azinphosmethyl (Guthion[®]) effectively controlled L. anaranjada but DDT and BHC failed. A preliminary field evaluation of four additional insecticides was made near Lake City, Florida, in 1966 in order to increase the arsenal of available insecticides and to search for chemicals less hazardous than azinphosmethyl.

METHODS

The insecticides and concentrations used in this test were as follows: 0.25-percent trichlorfon (Dylox[®]) water solution; 0.25-percent fenthion (Baytex[®] or Entex[®]) water emulsion; 0.1-percent water solution of Azodrin[®] (Shell SD 9129) dimethyl phosphate, ester with cis 3-hydroxy-N-methyl = crotonamide; and a 1.0-percent water emulsion of Gardona[®] (Shell SD 8447) 2-chloro-1-(2, 4, 5-tri = chlorophenyl) vinyl dimethyl phosphate. The above formulations were prepared from commercially available, water-emulsifiable or water-soluble concentrates; and no spreading or sticking agents were added. The insecticides were applied on May 10 and again on May 20 to second-year cones by means of a 1-quart hand sprayer until the cones were thoroughly wetted.

Twelve open-grown slash pines were used. The length of each tree crown was divided ocularly into three sectors, each sector containing approximately 20 cones. Insecticide treatments were randomly assigned to two sectors of each tree, and the third sector was left as an unsprayed check. A given insecticide treatment was replicated on six separate trees. A tree, therefore, would have to be considered as an incomplete block because not all treatments were used on each tree.

¹Merkel, E. P. Life history of the slash pine seedworm, Laspeyresia anaranjada Miller (Lepidoptera: Olethreutidae). Fla. Entomol. 50(3): 141-149. 1967.

²Merkel, E. P. Hydraulic spray applications of insecticides for the control of slash pine cone and seed insects. Southeast. Forest Exp. Sta., U. S. Forest Serv. Res. Pap. SE-9, 7 pp. 1964.

³Merkel, E. P., and Yandle, D. O. Mist blower applications of insecticides for cone insect control on slash pine. Southeast. Forest Exp. Sta., U. S. Forest Serv. Res. Note SE-52, 4 pp. 1965.

Mention of commercial products does not constitute endorsement by the U. S. Department of Agriculture. These insecticides cannot be recommended for these particular purposes until and unless they are so registered by the U. S. Department of Agriculture.

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Mature cones were collected in September 1966 and bisected in the laboratory in October to determine the presence or absence of overwintering larvae in the cone axes. The data for each treatment replicate were expressed as percent of cones infested (table 1).

Table 1. --Incidence of infestation by *L. anaranjada* in mature slash pine cones following different insecticide treatments--Olustee, Florida, 1966

Insecticide	Concentration by weight	Mean infestation ¹		Infestation reduction ²
		Sprayed	Not sprayed	
----- <u>Percent</u> -----				
Gardona® (SD 8447)	1.00	0.0	26.6	100
fenthion (Baytex®)	0.25	1.0	28.9	96
Azodrin® (SD 9129)	0.10	7.5	36.4	79
trichlorfon (Dylox®)	0.25	40.4	38.5	0

¹Total number of infested cones divided by total number of sound plus infested cones expressed as a percentage. Based on 15 to 25 sprayed cones compared with a similar number of unsprayed cones per tree and replicated on six individual trees.

$$^2\text{Percent of reduction in infestation} = \frac{\text{Mean percent of unsprayed cones infested minus mean percent of sprayed cones infested}}{\text{Mean percent of unsprayed cones infested}} \times 100$$

RESULTS AND DISCUSSION

Gardona® gave consistently complete control of *L. anaranjada* (table 1). When compared with infestation on unsprayed check cones, the fenthion treatment resulted in a 96-percent reduction in the mean percent of cone infestation; and Azodrin® gave a 79-percent reduction in mean percent of seedworm infestation. Trichlorfon did not control this seedworm.

Of the three insecticides that gave good control of *L. anaranjada*, Gardona® is rated very low in toxicity to mammals, fenthion is moderately toxic to warm-blooded animals, and Azodrin® is considered highly toxic. In view of the low toxicity hazards of fenthion and, particularly, Gardona®, further field experiments are needed (1) to evaluate the effectiveness of lower concentrations of these insecticides; (2) to determine the minimum number of spray applications required for good seedworm control; and (3) to make sure that the insecticides can be applied with spray machines under operational conditions in seed orchards.

Edward P. Merkel, Principal Research Entomologist
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